

**What is claimed is:**

1           1. A bi-directional shift-register circuit for  
2 outputting data in different turns according to a low-  
3 voltage clock signal, a first directional signal and a  
4 second directional signal, comprising:

5           a first shift-register unit having a first-stage  
6           input terminal, a first-stage output terminal,  
7           and a first-stage clock input terminal for  
8           receiving the low-voltage clock signal;

9           a second shift-register unit having a second-stage  
10          input terminal, a second-stage output terminal,  
11          and a second-stage clock input terminal for  
12          receiving the low-voltage clock signal;

13          a third shift-register unit having a third-stage  
14          input terminal, a third-stage output terminal  
15          and a third-stage clock input terminal for  
16          receiving the low-voltage clock signal;

17          a first bi-directional control circuit having a  
18          first input terminal coupled to the first-stage  
19          output terminal, a second input terminal  
20          coupled to the third-stage output terminal, and  
21          a first control terminal; the first bi-  
22          directional control circuit outputs the signal  
23          of the first-stage output terminal to the  
24          second-stage input terminal when the first  
25          control terminal receives the first directional  
26          signal and outputs the signal of the third-  
27          stage output terminal to the second-stage input

terminal when the first control terminal receives the second directional signal;  
a first level shifter coupled to the first-stage output terminal to amplify the signal of the first-stage output terminal;  
a second level shifter coupled to the second -stage output terminal to amplify the signal of the second-stage output terminal; and  
a third level shifter coupled to the third-stage output terminal to amplify the signal of the third-stage output terminal;  
wherein the second shift-register unit outputs the signal of the second-stage output terminal to the third-stage input terminal when the second-stage input terminal receives the signal of the first-stage output terminal and the second shift-register unit outputs the signal of the second-stage output terminal to the first-stage input terminal when the second-stage input terminal receives the signal of the third-stage output terminal.

2. The bi-directional shift-register circuit as claimed in claim 1, wherein the data is sequentially output by the first shift-register unit, the second shift-register unit and the third shift-register unit when the first control terminal receives the first directional signal.

3. The bi-directional shift-register circuit as claimed in claim 2, wherein the data is sequentially

output by the third shift-register unit, the second shift-register unit and the first shift-register unit when the first control terminal receives the second directional signal.

4. The bi-directional shift-register circuit as claimed in claim 1, further comprising:

a second bi-directional control circuit having a first input terminal coupled to the second-stage output terminal, a second input terminal coupled to a first clock signal, and a second control terminal; wherein the second bi-directional control circuit outputs the signal of the second-stage output terminal to the third-stage input terminal when the second control terminal receives the first directional signal and outputs the first clock signal to the third-stage input terminal when the second control terminal receives the second directional signal;

a third bi-directional control circuit having a first input terminal coupled to a second clock signal, a second input terminal coupled to the second-stage output terminal, and a third control terminal; wherein the second bi-directional control circuit outputs the second clock signal to the first-stage input terminal when the third control terminal receives the first directional signal and outputs the signal of the second-stage output terminal to the

26 first-stage input terminal when the third  
27 control terminal receives the second  
28 directional signal.

1 5. The bi-directional shift-register circuit as  
2 claimed in claim 1, wherein the first bi-directional  
3 control circuit comprises:

4 a first logic device coupled to the first-stage  
5 output terminal and the third-stage output  
6 terminal;

7 a controlling device for outputting the signal of  
8 the first-stage output terminal or the signal  
9 of the third-stage output terminal according to  
10 the signal of the first control terminal; and

11 a second logic device, coupled to an output terminal  
12 of the first logic device and an output  
13 terminal of the controlling device, for  
14 outputting the signal of the first-stage output  
15 terminal to the second-stage input terminal  
16 when the first control terminal receives the  
17 first directional signal, and outputting the  
18 signal of the third-stage output terminal to  
19 the second-stage input terminal when the first  
20 control terminal receives the second  
21 directional signal.

1 6. The bi-directional shift-register as claimed in  
2 claim 5, wherein the first and second logic devices are  
3 NOR logic gate.

1           7.   A bi-directional shift-register circuit for  
2   outputting data in different turns according to a low-  
3   voltage clock signal, a first directional signal and a  
4   second directional signal, comprising:

5           a first shift-register unit having a first-stage  
6               first input terminal, a first-stage second  
7               input terminal, a first-stage output terminal,  
8               and a first-stage clock input terminal for  
9               receiving the low-voltage clock signal;

10          a second shift-register unit having a second-stage  
11               first input terminal, a second-stage second  
12               input terminal, a second-stage output terminal,  
13               and a second-stage clock input terminal for  
14               receiving the low-voltage clock signal;

15          a third shift-register unit having a third-stage  
16               first input terminal, a third-stage second  
17               input terminal, a third-stage output terminal  
18               and a third-stage clock input terminal for  
19               receiving the low-voltage clock signal;

20          a first bi-directional control circuit having a  
21               first input terminal coupled to the first-stage  
22               output terminal, a second input terminal  
23               coupled to the third-stage output terminal, and  
24               a first control terminal; wherein the first bi-  
25               directional control circuit outputs the signal  
26               of the first-stage output terminal to the  
27               second-stage first input terminal, and outputs  
28               the signal of the third-stage output terminal  
29               to the second-stage second input terminal when

the first control terminal receives the first directional signal and outputs the signal of the third-stage output terminal to the second-stage first input terminal and outputs the signal of the first-stage output terminal to the second-stage second input terminal when the first control terminal receives the second directional signal;

a first level shifter coupled to the first-stage output terminal to amplify the signal of the first-stage output terminal;

a second level shifter coupled to the second -stage output terminal to amplify the signal of the second-stage output terminal; and

a third level shifter coupled to the third-stage output terminal to amplify the signal of the third-stage output terminal;

wherein the third-stage first input terminal receives the signal of the second-stage output terminal and the third-stage second input terminal receives a first clock signal when the second-stage first input terminal receives the signal of the first-stage output terminal and the second-stage second input terminal receives the signal of the third-stage output terminal and the first-stage first input terminal receives the signal of the second-stage output terminal, and the first-stage second input terminal receives a second clock signal when the second-stage first input terminal receives

60                   the signal of the third-stage output terminal  
61                   and the second-stage second input terminal  
62                   receives the signal of the first-stage output  
63                   terminal.

1           8.   The bi-directional shift-register circuit as  
2   claimed in Claim 7, wherein the data is sequentially  
3   output by the first shift-register unit, the second  
4   shift-register unit and the third shift-register unit  
5   when the first control terminal receives the first  
6   directional signal.

1           9.   The bi-directional shift-register circuit as  
2   claimed in claim 8, wherein the data is sequentially  
3   output by the third shift-register unit, the second  
4   shift-register unit and the first shift-register unit  
5   when the first control terminal receives the second  
6   directional signal.

1           10.  The bi-directional shift-register circuit as  
2   claimed in claim 9, further comprising:  
3           a second bi-directional control circuit having a  
4           first input terminal coupled to the second-  
5           stage output terminal, a second input terminal  
6           coupled to the first clock signal, and a second  
7           control terminal; wherein the second bi-  
8           directional control circuit outputs the signal  
9           of the second-stage output terminal to the  
10          third-stage first input terminal and outputs  
11          the first clock signal to the third-stage  
12          second input terminal when the second control

13           terminal receives the first directional signal  
14           and outputs the first clock signal to the  
15           third-stage first input terminal and outputs  
16           the signal of the second-stage output terminal  
17           to the third-stage second input terminal when  
18           the second control terminal receives the second  
19           directional signal;

20       a third bi-directional control circuit having a  
21       first input terminal coupled to the second  
22       clock signal, a second input terminal coupled  
23       to the second-stage output terminal, and a  
24       third control terminal; wherein the third bi-  
25       directional control circuit outputs the second  
26       clock signal to the first-stage first input  
27       terminal and outputs the signal of the second-  
28       stage output terminal to the first-stage second  
29       input terminal when the third control terminal  
30       receives the first directional signal and  
31       outputs the signal the second-stage output  
32       terminal to the first-stage first input  
33       terminal and outputs the second clock signal to  
34       the first-stage second input terminal when the  
35       third control terminal receives the second  
36       directional signal.

1           11. The bi-directional shift-register circuit as  
2       claimed in claim 10, wherein the first bi-directional  
3       control circuit comprises:

4           a first switch, having an input terminal coupled to  
5           the first-stage output terminal, a first output



6 terminal coupled to the second-stage first  
7 input terminal and a second output terminal  
8 coupled to the second-stage second input  
9 terminal, for outputting the signal of the  
10 first-stage output terminal to the second-stage  
11 first input terminal when the first control  
12 terminal receives the first directional signal;  
13 and

14 a second switch, having an input terminal coupled to  
15 the third-stage output terminal, a first output  
16 terminal coupled to the second-stage second  
17 input terminal and a second output terminal  
18 coupled to the second-stage first input  
19 terminal, for outputting the signal of the  
20 third-stage output terminal to the second-stage  
21 second input terminal when the first control  
22 terminal receives the second directional  
23 signal.

1 12. The bi-directional shift-register circuit as  
2 claimed in claim 11, wherein the first switch outputs the  
3 signal of the first-stage output terminal to the second-  
4 stage second input terminal and the second switch outputs  
5 the signal of the third-stage output terminal to the  
6 second-stage first input terminal when the first control  
7 terminal receives the second directional signal.